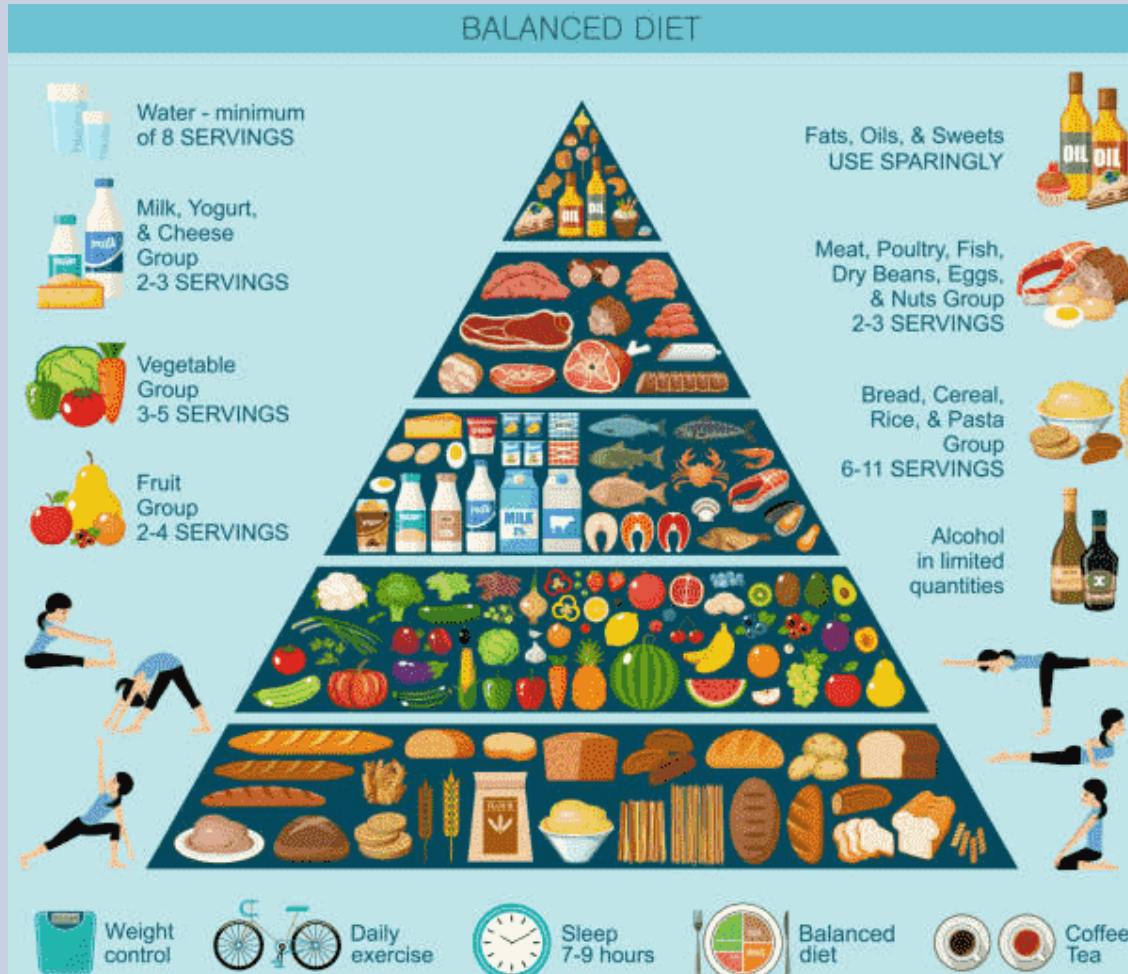
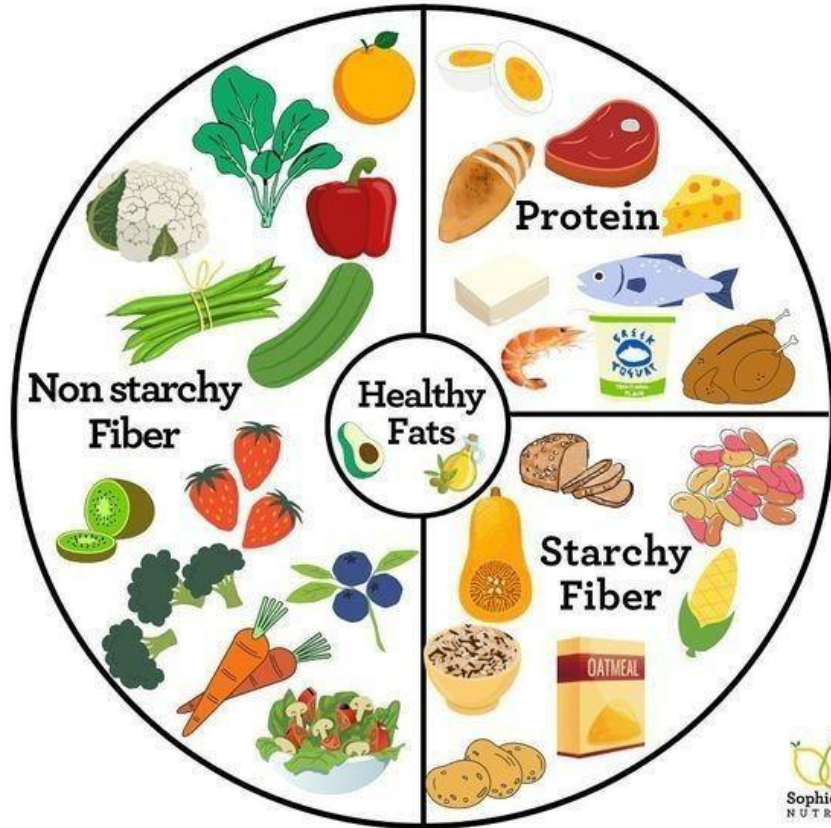


BALANCED DIET

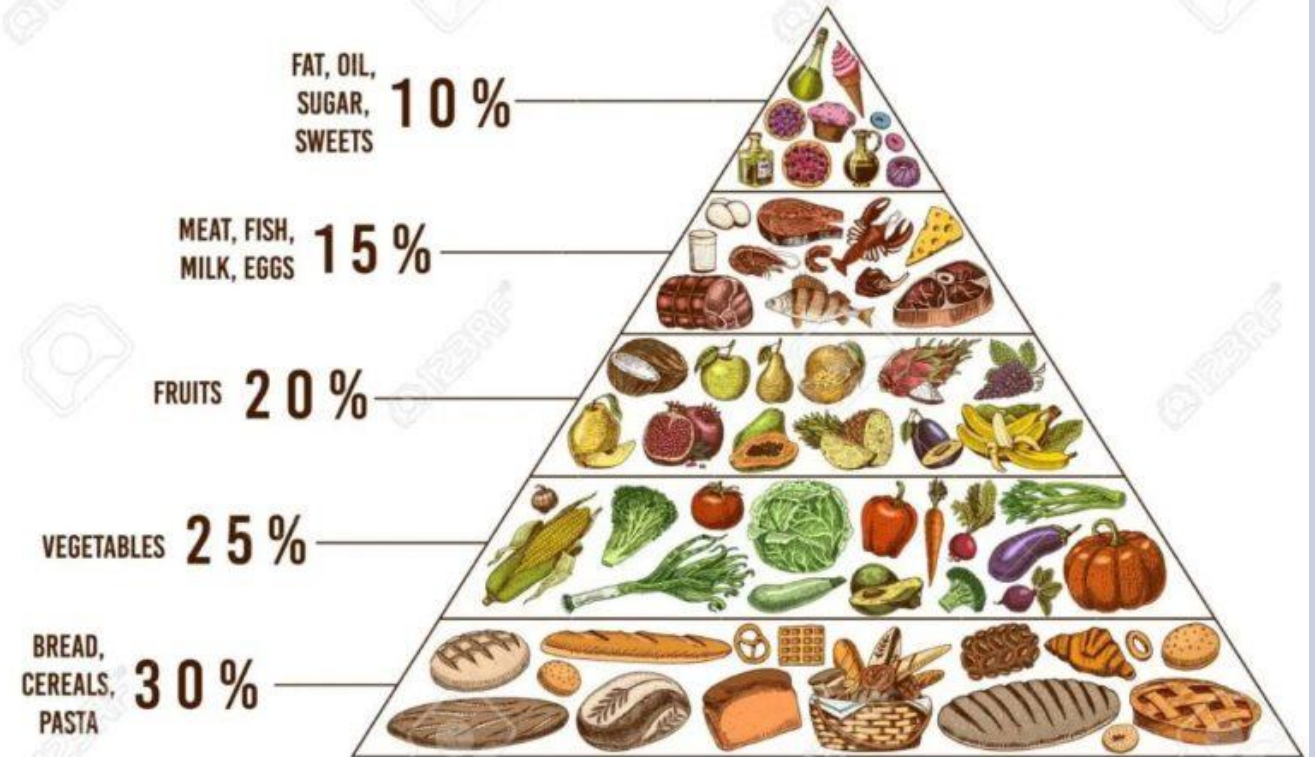


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The Well-Balanced Plate



THE FOOD PYRAMID



- Nutrition refers to the intake of food in relation to the body's dietary requirements.
- Good nutrition involves consuming an adequate, well-balanced diet along with regular physical activity. It is the cornerstone of good health.
- Poor nutrition can: Weaken immunity , Increase susceptibility to diseases , Impair physical and mental growth and Reduce productivity
- Balanced diet should provide **adequate energy + essential nutrients** to maintain health and normal body functions.
- A well-balanced diet helps maintain overall health and optimal body function.
- **A Balanced Diet is defined as a diet that contains appropriate proportions of macronutrients and micronutrients required for normal growth, maintenance, and daily activities.**

WHO Composition of a Balanced Diet

Balanced diet is the diet that contains the required number of calories, vitamins and minerals that are essential to keep a person healthy.

A balanced diet is a mix of Carbohydrates (50%), Fats (32%), Proteins (12%), Minerals and Vitamins (3%) and sufficient water

COMPOSITION OF A BALANCED DIET

- A balanced diet should include:
 1. Carbohydrates – 50% (primary energy source)
 2. Fats – 30–32% (energy storage, cell structure)
 3. Proteins – 10–12% (growth and repair)
 4. Vitamins & Minerals – ~3% (regulatory functions)
 5. Water – essential for all physiological processes
 6. Fruits & vegetables: ≥ 400 g/day
 7. Free sugars: $< 10\%$ of total energy
 8. Salt: < 5 g/day

OBJECTIVES OF A BALANCED DIET

A balanced diet aims to:

1. Maintain good health and well-being
2. Provide sufficient energy for daily activities
3. Support growth, repair, and maintenance of body tissues
4. Enhance immunity and disease resistance

RECOMMENDATIONS BY World Health Organization (WHO)

WHO provides the following dietary guidelines:

1. **Maintain energy balance:** Consume calories appropriate to energy expenditure to maintain a healthy body weight
2. **Increase plant-based foods :** Eat more fruits, vegetables, legumes, whole grains, and nuts
3. **Limit unhealthy fats**
 1. Avoid saturated fats (e.g., animal fats, coconut oil)
 2. Prefer unsaturated fats (plant-based oils)
 3. Eliminate trans fats
4. **Reduce sugar intake:** Limit consumption of added sugars
5. **Limit salt intake**
 1. Reduce sodium consumption
 2. Use iodized salt

Other Important Dietary Recommendations

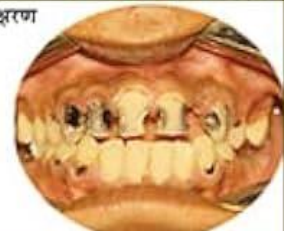
1. Include **protein-rich foods** such as fish, meat, eggs, or plant-based sources like soybeans
2. Even vegetarians can obtain all **essential amino acids** by combining cereals and pulses (e.g., rice + dal)
3. Foods like **avocado and pumpkin seeds** also provide a good amino acid profile
4. Ensure adequate intake of **micronutrients (vitamins and minerals)** through a diverse diet
5. Maintain proper **hydration**

NUTRITION DEFICIENCY DISORDERS

Nutritional deficiency disorders arise due to inadequate intake or absorption of essential nutrients such as macronutrients (proteins, fats, carbohydrates) and micronutrients (vitamins and minerals).

They can be broadly classified as follows:

DEFICIENCY DISEASES हीनताजनित रोग

Kwashiorkor क्याशियोरकर SYMPTOMS लक्षण 1. Swollen abdomen बुलबुल पेट 2. Hair changes colour बालों का रंग बदलना 3. Weight loss वजन कम होना CAUSES बहाने 1. Insufficient protein intake असufficient प्रोटीन सेवन		Marasmus मैरास्मस SYMPTOMS लक्षण 1. Extensive tissue and muscle wasting अधिकतम ऊतक व मांसपेशीय क्षय 2. Visible ribs सिखरी की हड्डी 3. Dry skin सूखी त्वचा 4. Gravel loss of adipose tissue चर्बी की हानि CAUSES बहाने 1. Severe protein-energy malnutrition असufficient प्रोटीन-ऊर्जा अभाव	
Osteomalacia (in adults) Rickets (in children) अस्थिपुट्टा (वयस्क में) रिकेट्स (बच्चों में) SYMPTOMS लक्षण 1. Softening of the bones in children बच्चों में हड्डियों का नरम होना 2. Fractures and deformity अस्थिभंग व विकृति CAUSES बहाने 1. Vitamin D deficiency विटामिन D की कमी		Beri-Beri बेरी-बेरी SYMPTOMS लक्षण 1. Weight loss वजन कम होना 2. Impaired sensory perception असufficient अंतर्ग्रहण 3. Weakness and pain in the limbs कमजोरी व अंगों में दर्द 4. Wasting and partial paralysis क्षय व आंशिक पक्षाघात CAUSES बहाने 1. Lack of Thiamine (Vitamin B1) थायमिन (विटामिन बी 1) की कमी	
Goitre गेंथा SYMPTOMS लक्षण 1. Enlarged thyroid gland बढ़ी हुई थायराइड ग्रंथि 2. Emotional upsets आवृत्त बर्तन 3. Depression दुःख, निराशा 4. Loss of weight वजन कम होना CAUSES बहाने 1. Iodine deficiency आयोडीन की कमी		Anaemia अरक्तता SYMPTOMS लक्षण 1. Weakness or fatigue कमजोरी व थकान 2. Pale skin, mucous membranes and nail beds सफेद त्वचा, श्लेष्मिक झिल्ली व नाखून CAUSES बहाने 1. Iron deficiency लौह की कमी	
Night Blindness रातींधी SYMPTOMS लक्षण 1. Difficulty or inability to see in low light or darkness कम प्रकाश या अंधेरे में देखने में असमर्थता 2. Dry eyes सूखी आंखें 3. Blurred vision धुंधली दृष्टि CAUSES बहाने 1. Lack of vitamin A विटामिन A की कमी		Scurvy स्कर्वी SYMPTOMS लक्षण 1. Dark purplish spots on skin गहरे या सफेद धब्बे 2. Bleeding from all mucous membranes सभी श्लेष्मिक झिल्ली से रक्तस्राव 3. Bleeding gums रक्तस्रावी दाँत 4. Swollen eyes बढ़ी हुई आंखें CAUSES बहाने 1. Insufficient intake of vitamin C असufficient विटामिन C सेवन	
Pellagra पेलाग्रा SYMPTOMS लक्षण 1. Dermatitis, especially seborrheic dermatitis त्वचा रोग, विशेष रूप से सेबोर्रिक डर्मेटिस 2. Red skin lesions लाल त्वचा रोग 3. Weakness कमजोरी 4. Dementia मनोरोग 5. Eventually dementia अंत में, मनोरोग CAUSES बहाने 1. Lack of niacin (Vitamin B3) नायसिन (विटामिन बी 3) की कमी		Dental Caries दाँत क्षरण SYMPTOMS लक्षण 1. Enamel loss दाँत की चर्बी 2. Weakening effect on bone अस्थि की कमजोरी 3. Discolouration of teeth दाँत का काला पड़ना CAUSES बहाने 1. A fluoride deficiency फ्लोराइड की कमी	

Category	Nutrient Deficiency	Disorder	Sign and symptom
Protein–Energy Malnutrition	Protein & Calories	Kwashiorkor	Edema, fatty liver, growth retardation
		Marasmus	Severe wasting, muscle loss, no edema
	Severe early malnutrition	Mental Retardation	Impaired brain development
Mineral Deficiency	Calcium	Osteoporosis	Weak bones, fractures
		Rickets	Bone deformities in children
		Tetany	Muscle spasms, cramps
	Iodine	Goiter	Enlargement of thyroid gland
	Iron	Iron Deficiency Anemia	Fatigue, pallor, weakness

Vitamin Deficiency

Vitamin A	Night blindness, Xerophthalmia	Vision problems, dryness of eyes
Thiamine Vit B1	Beriberi	Neurological & cardiovascular symptoms
Riboflavin Vit B2	Ariboflavinosis	Cheilosis, glossitis, dermatitis
Niacin Vit B3	Pellagra	Dermatitis, diarrhea, dementia
Pantothenic acid Vit B5	Rare deficiency	Paresthesia, fatigue
Pyridoxine Vit B6	Anemia, neuropathy	Dermatitis, depression
Biotin	Rare deficiency	Neurological symptoms, hair loss
Folic acid	Megaloblastic anemia	Macrocytic anemia
Cobalamin Vit B12	Pernicious anemia	Neuropathy, memory loss
Vitamin C	Scurvy	Bleeding gums, poor healing
Vitamin D	Rickets / Osteomalacia	Weak or soft bones
Vitamin E	Neuropathy, hemolysis	Muscle weakness, anemia
Vitamin K	Bleeding disorders	Hemorrhage, delayed clotting

Protein Deficiency Disorders

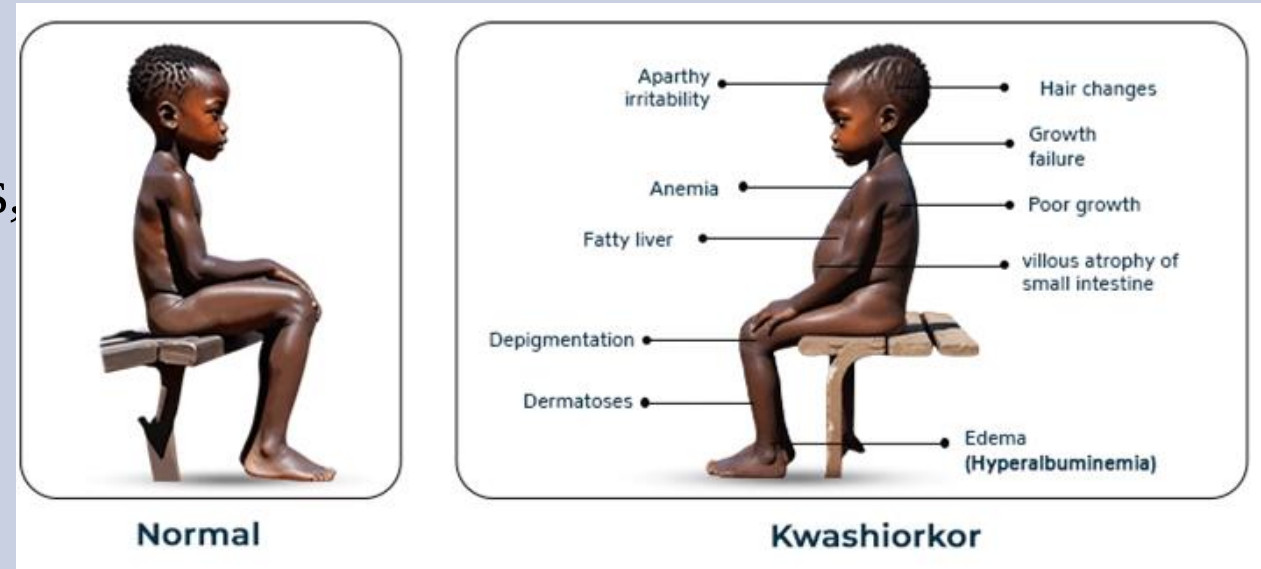
Kwashiorkor

- "Kwashiorkor" was first identified by a Jamaican pediatrician Dr. Cicely Williams in young children as an acute form of protein-energy malnutrition characterized by edema, irritability, anorexia, ulcerating dermatoses and an enlarged liver with fatty infiltrates.
- This situation develops in young children when the mother replaces the breast milk which is rich in proteins and vital amino acids with diet rich in carbohydrates.
- As a result of insufficient protein consumption, but with sufficient calorie intake, kwashiorkor develops. Kwashiorkor cases are often seen in areas of poor food supply.



Signs and symptoms: The signs and symptoms of Kwashiorkor are

1. Typical ulcerating dermatosis
2. Pedal edema (swelling of the feet)
3. Distended abdomen
4. An enlarged liver with fatty infiltrates,
5. Thinning hair
6. Loss of teeth,
7. Skin depigmentation and dermatitis.
8. Irritability
9. Anorexia.



- Victims of Kwashiorkor fail to produce antibodies following vaccination against diseases, including diphtheria and typhoid.
- Generally, the disease can be treated by adding protein to the diet; however, it can have a long-term impact on a child's physical and mental development, and in severe cases this may lead to death.
- **Management:** The children affected with Kwashiorkor should be fed with dietary protein gradually

Marasmus

- The word "Marasmus" comes from the Greek marasmos ("decay") and is defined as the gradual wasting away of the body due to severe malnutrition or inadequate absorption of food.
- Marasmus is a form of severe protein deficiency and is one of the forms of protein-energy malfunction (PEM).
- The children with marasmus look emaciated and body weight may be reduced to less than 80% of the average weight that corresponds to the height.
- Marasmus is often seen prior to one year of age, whereas kwashiorkor is seen after 18 months of age.
- Marasmus can be distinguished from kwashiorkor through symptoms of protein wasting with the presence of edema.
- The prognosis is better than the kwashiorkor disease.
- **Causes:** Marasmus is caused by a severe deficiency of nearly all nutrients, especially protein and carbohydrates.



Signs and symptoms:

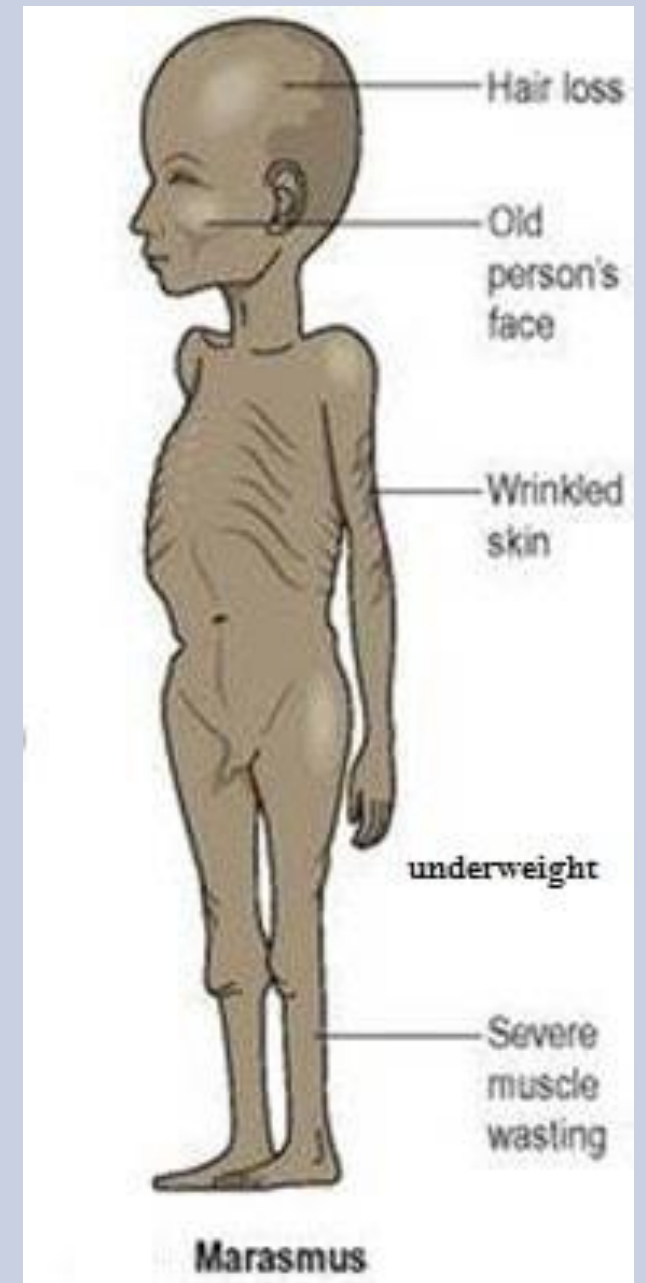
The malnutrition associated with marasmus leads to extensive tissue and muscle wasting, as well as variable edema.

Other common signs and symptoms include

1. Dry skin,
2. Loose skin folds hanging over the buttocks (glutei) and arm pit (axillae) etc.
3. Drastic loss of adipose tissue from normal areas of fat deposits like buttocks and thighs.
4. Fretful, Irritable, and voraciously hungry.

Treatment:

It is necessary to treat not only the symptoms but also the complications of the disorder, including infections, dehydration, and circulation disorders, which are frequently lethal and lead to high mortality if ignored.



Two Types of Malnutrition

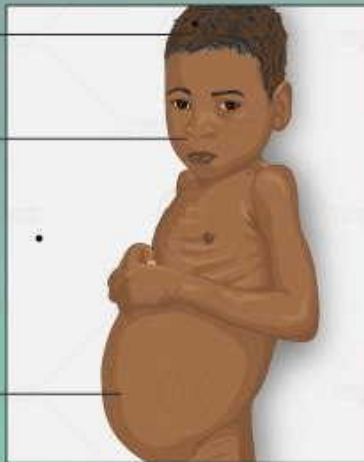


Thin and brittle hair

Moon face

Bulging abdomen (ascites)

Kwashiorkor



Thin and brittle hair

Simian facies

Loss of muscle mass

Marasmus



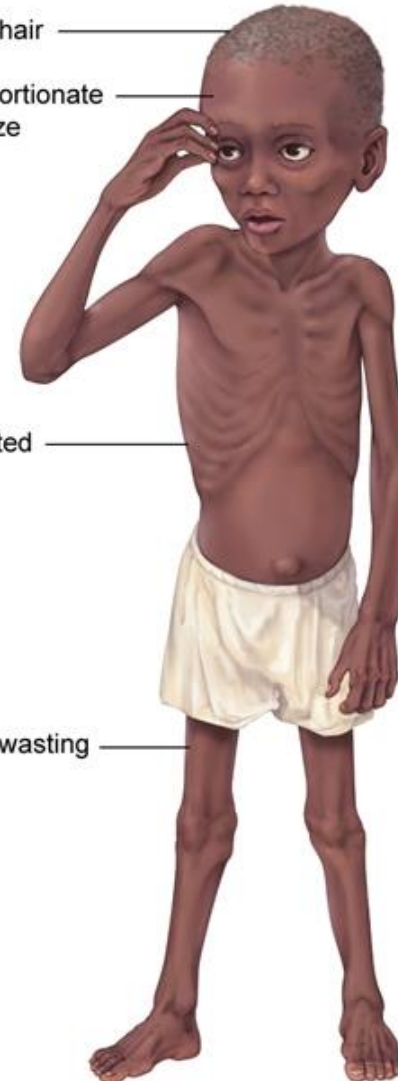
Marasmus

Sparse hair

Disproportionate head size

Emaciated

Muscle wasting



Kwashiorkor

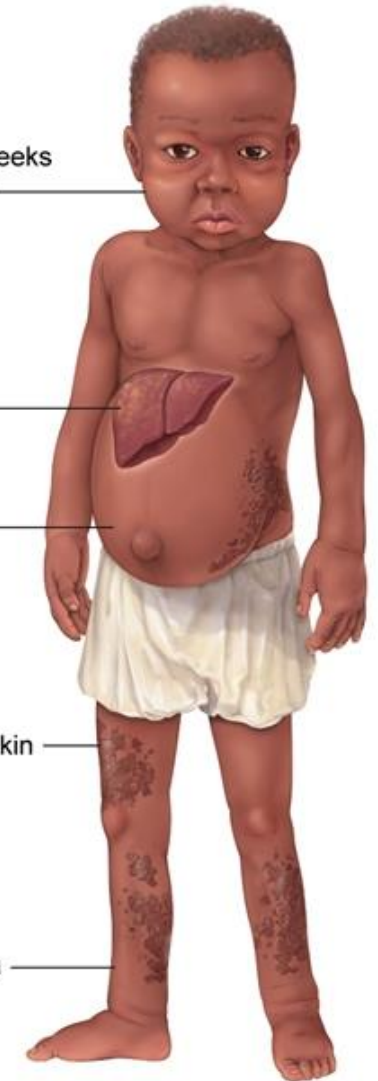
Prominent cheeks (moon face)

Fatty liver

Protuberant abdomen

Dry, peeling skin

Pitting edema



Cachexia (wasting syndrome)

1. Cachexia is defined as a state of weight loss, muscle atrophy, fatigue, weakness, and significant loss of appetite due to some pathological involvement.
2. Cachexia physically weakens the patients to a state of immobility starting from loss of appetite, asthenia, and anemia.
3. The patients with Cachexia will respond poorly to standard treatment.
4. Cachexia is seen in patients with cancer, AIDS, chronic obstructive lung disease, multiple sclerosis, congestive heart failure, tuberculosis, familial amyloid polyneuropathy, mercury poisoning (acrodynia) and hormonal deficiency.
5. Cachexia is considered as a positive risk factor for death.
6. Treatment: Currently, no FDA-approved drugs are available to treat Cachexia. Cachexia may be treated by steroids, such as corticosteroids, or drugs that mimic progesterone, which increase appetite, may reverse weight loss, but have no evidence of reversing muscle loss.



Vitamin Deficiency Disorders

- Vitamins are organic components in food that are needed in very small amounts for growth and maintaining of good health.
- First time the term "Vitamin" was coined in 1912 by the polish bio chemist Kazimierz Funk.
- All vitamins are classified in to
 - 1) Fat soluble vitamins e.g., A, D, E and K.
 - 2) Water soluble vitamins e.g., B-Complex and Vitamin C.

Functions of Vitamins

- Vitamins have diverse biochemical functions such as
 1. Hormone-in regulating mineral metabolism e.g., vitamin D
 2. Regulator of cell and tissue growth and differentiation (e.g., some forms of vitamin A)
 3. Antioxidants (e.g., vitamin E and sometimes vitamin C)
 4. Precursors for enzyme cofactors that help enzymes in their work as catalysts in metabolism e.g., Vitamin B Complex.

Vitamin A Deficiency Disorder

- Vitamin A deficiency is lack of vitamin A in the human body.
- Night blindness is the first sign of vitamin A deficiency.
- Vitamin A play a major role in phototransduction and its deficiency may result in xerophthalmia, keratomalacia, and complete blindness.
- Every year approximately 2-5 lakh children from developing countries are suffering from Vitamin A deficiency and half of them die within a year due to blindness.
- Prevalence of night blindness due to vitamin A deficiency is also high among pregnant women in many developing countries.

Functions of Vitamin A

1. Gene transcription
2. Immune function
3. Embryonic development and reproduction
4. Bone metabolism

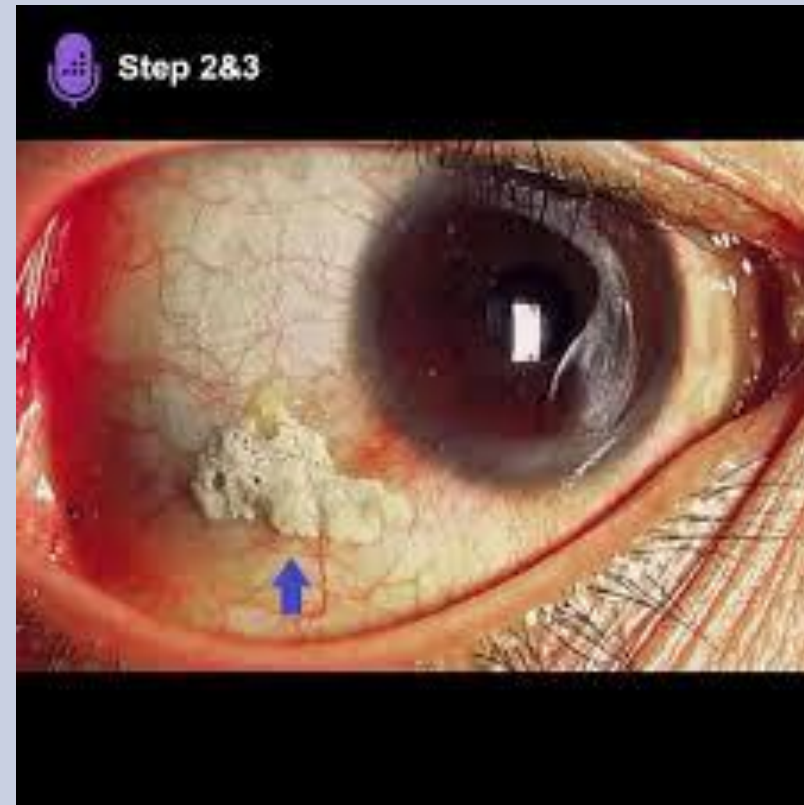
Signs and Symptoms

Vitamin A deficiency may cause

1. Night blindness,
2. Xerophthalmia,
3. Keratomalacia
4. Complete blindness
5. Impaired immune function
6. Birth defects

Causes Vitamin A Deficiency

1. Lactating mother with vitamin A deficiency contains little vitamin A, which provides a breast-fed child with too little vitamin A.
2. Iron deficiency can affect vitamin A uptake.
3. Excess alcohol consumption can deplete vitamin A



- **Management:** Deficiency of Vitamin A can be achieved by eating vitamin A rich foods and external supplementation of Vitamin A preparations.
- **Vitamin A Supplementation:** The average daily requirement of Vitamin A
 1. For children is 300-600 µg,
 2. For adults is 700 µg to 900 µg (3000 IU) and
 3. For lactating mothers is 1500-1800 µg (5000 IU to 6000 IU).

Vitamin A is found naturally in many foods:

1. Liver (beef, pork, chicken, turkey, fish) (6500 µg), including cod liver oil
2. Dandelion greens (5588 IU)
3. Carrot (835 µg)
4. Broccoli leaf (800 µg)
5. Sweet Potato (709 µg)
6. Butter (684 µg)
7. Spinach (469 µg)
8. Pumpkin (400 µg)
9. Cheddar cheese (265 µg)
10. Egg (140 µg)
11. Apricot (96 µg)
12. Papaya (55 µg)
13. Mango (38 µg)
14. Pea (38 µg)

Vitamin D Deficiency Disorder

1. Vitamin D is a group of fat-soluble secosteroids and is also called as sunshine vitamin.
2. In humans when sun exposure is adequate, vitamin D is synthesized from the body cholesterol. Vitamin D can be ingested as Cholecalciferol (vitamin D₃) or Ergocalciferol (vitamin D₂).
3. In the liver, Vitamin D is converted in to calcidiol and is further converted in to calcitriol in the kidneys which is biologically active form of Vitamin D.
4. Calcitriol circulates in the blood as a hormone regulating the concentration of calcium and phosphate in blood and promote the healthy growth and remodeling of bone.
5. Calcidiol is also converted to Calcitriol outside of the kidneys for other purposes, such as the proliferation, differentiation and apoptosis of cells.
6. Calcitriol also affects neuromuscular function and inflammation.

Functions of Vitamin D

1. Maintain the normal calcium and phosphorus levels in the body to build strong bones, teeth and nails.
2. Supporting the cell functions and other neuromuscular functions in the body.
3. Controls the supply of calcium between the bones and the blood and supports bone mineralization (hardening of bones) and bone remodeling by osteoblasts and osteoclasts.
4. Preventing of rickets in children, and osteoporosis or osteomalacia in adults.
5. Vitamin D as a powerful antioxidant and anti-carcinogen, it helps in combating depression, prostate cancer, breast cancer, high blood pressure, cardiovascular diseases, phagocytosis activity and boosts anti-tumor activity.
6. Vitamin D also helps treating conditions like diabetes and obesity, and prevents the onset of multiple sclerosis.
7. Vitamin D helps in maintaining a healthy immune system in the body.

Sources of Vitamin D

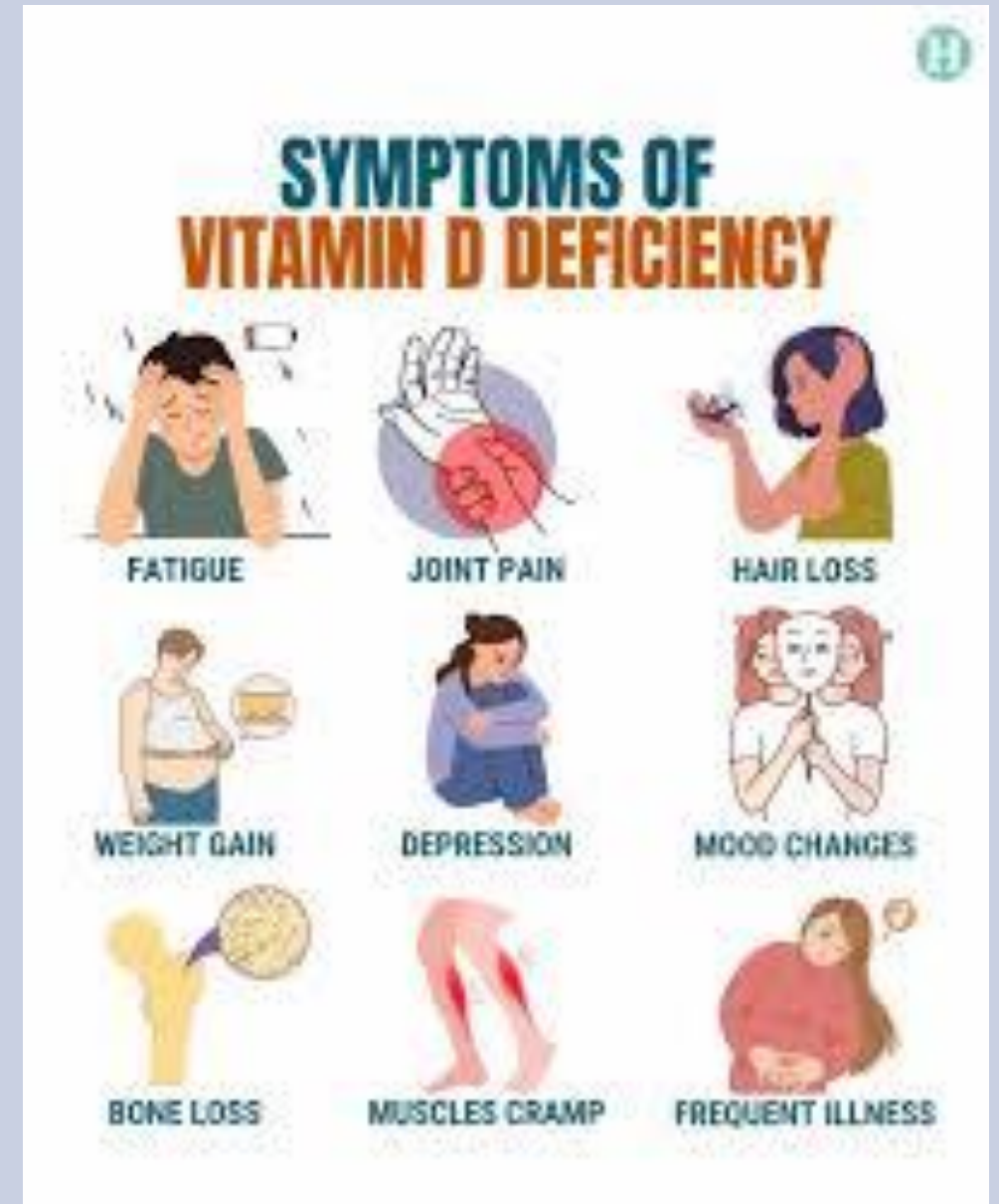
1. The main source of vitamin D is exposure of an individual is to the sun's UVB rays.
2. Apart from this, Vitamin D is found in various types of fish such as herring, mackerel, salmon, and sardines.
3. It is also available in other food sources such as egg yolks, orange juice, cereals, green leafy vegetables, fish liver oils, yogurt, cheese, etc.
4. Fortified foods are other common sources of vitamin D. In fact, one cup of vitamin D fortified milk provides one-half of the recommended vitamin D for people between the ages of 19 and 50 years.

Vitamin D Deficiency Disorders

1. A diet deficient in vitamin D causes osteomalacia (softening of the bones) in elders and rickets in children.
2. Avoiding the exposure to sun may result in low blood Calcidiol (25-hydroxy-vitamin D) and that may cause Vitamin D deficiency disorder.

Management

Dietary supplementation of Vitamin D₂ (Mushrooms) and Vitamin D, (Fish liver oils, Egg and Beef liver.



Vitamin E Deficiency Disorders

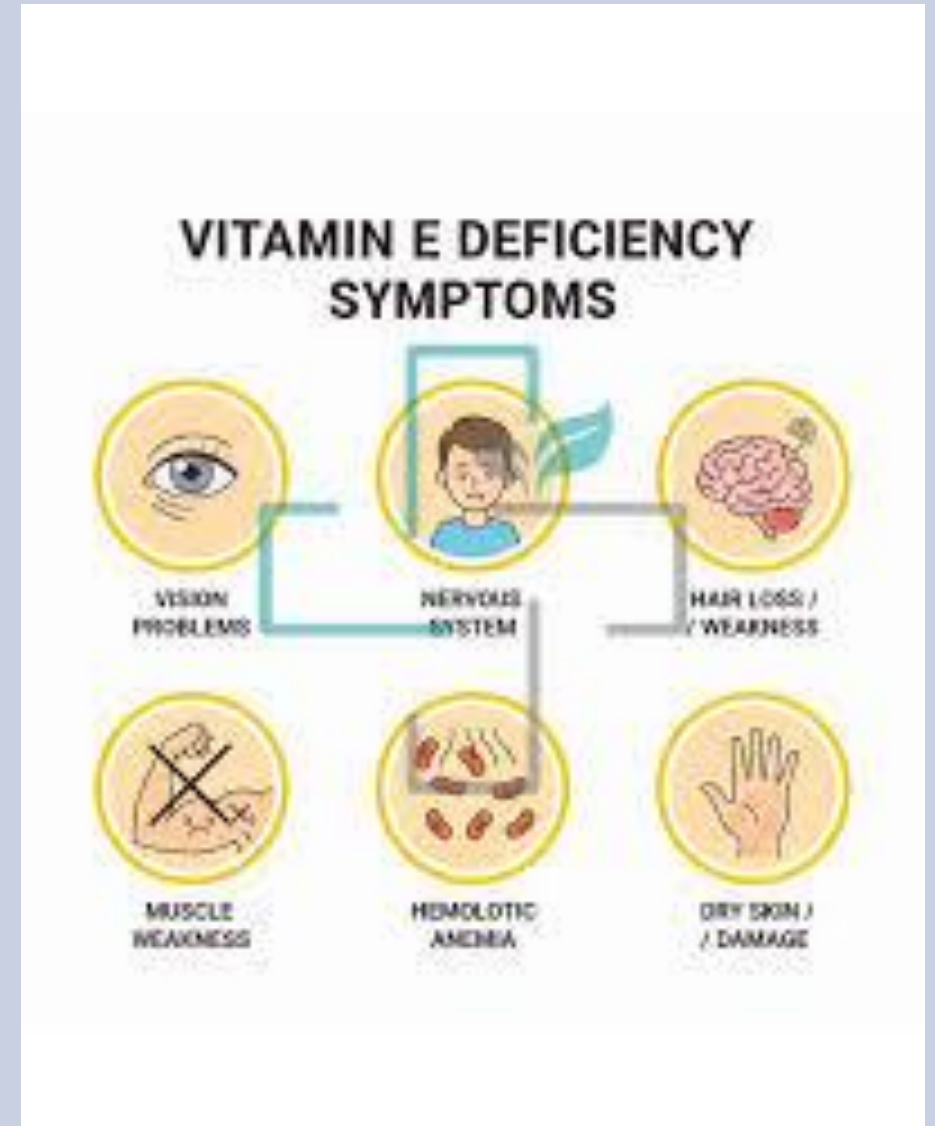
- Vitamin E is a group of eight fat-soluble compounds that include both tocopherols and tocotrienols. Among the tocopherols, α -Tocopherol is biologically active form of vitamin E.
- Tocotrienols is much less studied. Some in vivo studies have observed that tocotrienols have specialized roles in protecting neurons from damage and cholesterol reduction by inhibiting the activity of HMG-CoA reductase, delta-tocotrienol blocks processing of sterol regulatory element-binding proteins (SREBPs).
- Oral consumption of tocotrienols is also thought to protect against stroke-associated brain damage

Dietary Sources

1. Vitamin E is found most abundantly in wheat germ oil, sunflower oil, safflower oil, nuts and nut oils, like almonds and hazelnuts, palm oil.
2. It is also found in high-value green, leafy vegetables like spinach, turnip, broccoli, avocados, asparagus, kiwifruit (green), pumpkin, sweet potato, mangoes, tomatoes, rockfish, and papaya.
3. It is an antioxidant that stops the production of reactive oxygen species formed when fat undergoes oxidation.

Functions Vitamin E has following functions:

1. Prevents the oxidative damage of the cell membranes
2. Prevents unnecessary growth of the smooth muscle.
3. Responsible for the repair of wounds.
4. Vitamin E plays a role in neurological functions
5. It inhibits platelet aggregation.
6. Vitamin E also protects lipids and prevents the oxidation of polyunsaturated fatty acids (PUFAs.)



Deficiency Disorders of Vitamin E

Dietary deficiency of Vitamin E causes

1. Spinocerebellar ataxia
2. Myopathies
3. Peripheral neuropathy
4. Ataxia
5. Skeletal myopathy
6. Retinopathy
7. Impairment of the immune response
8. Erythrocyte hemolysis
9. Male infertility.

Treatment

- Individuals who cannot absorb fat may require a vitamin E supplement because some dietary fat is needed for the absorption of vitamin E from the gastrointestinal tract.
- Anyone diagnosed with cystic fibrosis, individuals who have had part or all of their stomach removed, and individuals with malabsorptive problems such as Crohn's disease, liver disease or pancreatic insufficiency may not absorb fat and may require supplemental vitamin E.
- Dose of Vitamin E The recommended dietary allowance (RDA) for vitamin E is quite low, 15 to 20 International Units (IU) per day. The most commonly recommended dosage of supplemental vitamin E for adults is approximately 300 to 800 IU per day.

Vitamin K Deficiency Disorder

- Vitamin K is an essential, lipid-soluble vitamin that plays a key role in the production of coagulation proteins.
- Vitamin K is a mixture of three types.
 - They are K-1 (also known as phylloquinone or phytonadione), which is derived from plants; K-2 (menaquinone), which is produced by the intestinal flora; and
 - K-3 (menadione), which is a synthetic, water-soluble form commonly used for treatment.
- Estimated daily requirement of Vitamin K is 100-200 mcg/day. About 80-85% of Vitamin K is absorbed mainly in the terminal ileum into the lymphatic system; therefore, bile salts and normal fat absorption, as well as normal-functioning villi of the ileum, are necessary for the effective uptake of Vitamin K.

Symptoms of Vitamin K Deficiency

1. Symptoms Vitamin K deficiency include **ecchymosis, petechiae, hematomas, oozing of blood at surgical or puncture sites, stomach pains; risk of massive uncontrolled bleeding; cartilage calcification; and severe malformation of developing bone or deposition of insoluble calcium salts in the walls of arteries.**
2. In infants, it can cause some birth defects such as underdeveloped face, nose, bones, and fingers.

Dietary Sources of Vitamin K

1. Vitamin K is found in green, leafy vegetables and in oils, such as soyabean, cottonseed, canola, and olive oils.
2. It can also be synthesized from colonic bacteria.
3. Diet is the main source of Vitamin K.

Deficiency Disorders of Vitamin B complex

- Vitamin B complex is a group of water-soluble vitamins, easily dispersed throughout the body.
- Most of the B vitamins must be replenished regularly, since any excess is excreted in the urine. This can result in the production of bright green-yellow color urine.
- The B complex vitamin was once thought to be a single vitamin, referred to as vitamin B. However the research findings have suggested that they are chemically distinct and often coexist in the same foods.
- B vitamin supplements are referred as B complex named specifically by different names for each vitamin (e.g., B1, B2, B3 etc.).
- Following are the vitamin B Complex.
 1. Vitamin B1 (thiamine)
 2. Vitamin B2 (riboflavin)
 3. Vitamin B3 (niacin)
 4. Vitamin B5 (pantothenic acid)
 5. Vitamin B6 (pyridoxine)
 6. Vitamin B7 (biotin)
 7. Vitamin B9 (folic acid)
 8. Vitamin B12 (Cyanocobalamin)

Functions of Vitamin B Complex

The Vitamin B Complex is essential to

1. Support and increase the rate of metabolism
2. Maintain healthy skin, hair and muscle tone
3. Enhance immune and nervous system functions
4. Promote cell growth and division, including that of the red blood cells that help
5. prevent anemia
6. Reduce the risk of pancreatic cancer
7. Reduce the symptoms of attention deficit hyperactivity disorder.

- Several diseases may result due to inadequate intake of B vitamin supplements.
- Deficiencies of B-Complex vitamins result in symptoms that are not part of a named deficiency disease.
- **Dietary Sources of Vitamin B Complex**
 1. B-Complex vitamins are found in whole unprocessed foods.
 2. Processed carbohydrates such as sugar and white flour tend to have lower B vitamin than their unprocessed counterparts.
 3. For this reason, thiamine, riboflavin, niacin, and folic acid is added to white flour after processing.
 4. B vitamins are richly present in tuna and turkey meat and in fish liver.
 5. Good sources for B vitamins include whole grains, potatoes, bananas, lentils, chilli peppers, tempeh, beans, nutritional yeast, brewer's yeast, and molasses.

Vitamin	Name	Deficiency Disorder	Key Symptoms
B ₁	Thiamine	Beriberi, Wernicke–Korsakoff syndrome	Weight loss, neuropathy, edema, heart failure, confusion, memory loss
B ₂	Riboflavin	Ariboflavinosis	Cheilosis, angular stomatitis, glossitis, dermatitis, photophobia
B ₃	Niacin	Pellagra	Dermatitis, diarrhea, dementia, confusion
B ₅	Pantothenic acid	Rare deficiency	Acne, paresthesia
B ₆	Pyridoxine	Anemia, neuropathy	Microcytic anemia, dermatitis, depression, ↑ homocysteine
B ₇	Biotin	Rare deficiency	Neurological symptoms, impaired growth (infants)
B ₉	Folic acid	Megaloblastic anemia	Macrocytic anemia, ↑ homocysteine
B ₁₂	Cobalamin	Pernicious anemia	Neuropathy, memory loss, anemia, psychosis, paralysis

1. Daily requirement of Vitamin B Complex: On individual basis, Vitamin B complex is required in different doses.
2. However elderly people and athletes may require additional B₁₂ and other Vitamin B supplementation
3. type 1 and type 2 diabetics may require thiamine based supplementation.
4. This is may be due to high prevalence of low plasma thiamine concentration and increased thiamine clearance associated with diabetes.
5. Vitamin B, (folic acid) deficiency in early embryo development has been linked to neural tube defects. Thus, women planning to become pregnant are usually encouraged to increase daily dietary folic acid intake and/or take a supplement.

RDA of Balanced Diet as per Government of India

- According to the Indian Council of Medical Research (ICMR), the recommended dietary intake for a balanced diet in an average adult is:
 1. **Energy:** 1900–2400 kcal/day (depends on age, gender, activity)
 2. **Proteins:** 0.8–1 g/kg body weight (~50–60 g/day)
 3. **Fats:** 20–30% of total energy
 4. **Carbohydrates:** 55–65% of total energy
 5. **Calcium:** ~600 mg/day
 6. **Iron:** 17–21 mg/day
 7. **Vitamins:** As per daily requirements
 8. **Water:** ~2–3 liters/day